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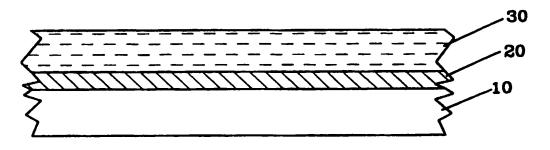
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(54) Title: LITHIUM ANODES FOR ELECTROCHEMICAL CELLS



(57) Abstract: Provided are anodes for use in electrochemical cells, wherein the anode comprises an anode active layer comprising lithium and a polymer anode substrate comprising a polymer film layer and a protective crosslinked polymer layer, in which the protective crosslinked polymer layer is in contact with the anode active layer on the side opposite to the surface in contact with the polymer film layer. The present invention also pertains to methods for forming such anodes and electrochemical cells comprising such anodes. The polymer film layer may be a terephthalate, a naphthalate, or an isophthalate, i.e. a polyester film. The protective crosslinked polymer layer may consist of acrylate polymer.

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C. DOCUME	ENTS CONSIDERED TO BE RELEVANT			
Category °	Citation of document, with indication, where appropriate, of the rel	evant passages	Relevant to claim No.	
X	US 5 478 676 A (TURI ERAN ET AL) 26 December 1995 (1995-12-26) abstract; figures 2,3 column 2, line 10 - line 17 column 3, line 7 -column 4, line	12-14, 22,23		
Υ	column 4, line 44 — line 45; exam 12,14	1-3,6,9		
		-/		
X Furth	er documents are listed in the continuation of box C.	X Patent family members are listed	in annex.	
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Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT					
egory °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.			
	US 4 615 961 A (PARK GEORGE B ET AL) 7 October 1986 (1986-10-07)	12,15, 19,20, 22,23			
	abstract column 2, line 50 -column 3, line 27 column 4, line 21 - line 32 column 6, line 30 - line 55 column 8, line 11 - line 15				
	column 10, line 4 - line 8	1,6-9			
(US 5 066 554 A (HOPE HENRY F ET AL) 19 November 1991 (1991-11-19) abstract; figure 3	12,20, 22,23			
•	column 2, line 14 - line 49	1,6-9			
•	US 5 395 644 A (AFFINITO JOHN D) 7 March 1995 (1995-03-07) column 2, line 25 - line 27 column 3, line 49 -column 4, line 32 column 5, line 10 - line 37	1-3,6-9			
1	US 6 277 514 B1 (YING QICONG ET AL) 21 August 2001 (2001-08-21) the whole document	22			
	· ·				

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INTERNATION SEARCH REPORT

formation on patent family members

ional Application No PCT/US 01/49170

					01/491/0
Patent document cited in search report		Publication date		Patent family member(s)	Publication date
US 5478676	Α	26-12-1995	EP	0782771 A1	09-07-1997
33 3 ., 33, 3	••		JP	11505660 T	21-05-1999
			WO.	9604689 A1	15-02-1996
					15 02 1990
US 4615961	Α	07-10-1986	ΑT	60464 T	15-02-1991
			ΑU	573637 B2	16-06-1988
			ΑU	3496184 A	09-05-1985
			CA	1244876 A1	15-11-1988
			DE	3484011 D1	28-02-1991
			EP	0146246 A1	26-06-1985
			GB	2149565 A ,B	12-06-1985
			IL	73398 A	20-10-1987
			IN	163202 A1	20-08-1988
			JP	60115156 A	21-06-1985
			ZA	8408594 D	30-07-1986
US 5066554	A -	19-11-1991 	NONE		
US 5395644	Α	07-03-1995	US	5260095 A	09-11-1993
			US	5547508 A	20-08-1996
			ΑT	170779 T	15-09-1998
			CA	2142895 A1	03-03-1994
			DE	69320971 D1	15-10-1998
			DE	69320971 T2	27-05-1999
			DK	655954 T3	07-06-1999
			ΕP	0655954 A1	07-06-1995
			JP	8503099 T	02-04-1996
			WO	9404285 A1	03-03-1994
US 6277514	B1	21-08-2001	US	6183901 B1	06-02-2001
			US	6194098 B1	27-02-2001
			AU	2196000 A	03-07-2000
			AU	2368100 A	03-07-2000
			CN	1334969 T	06-02-2002
			CN	133 49 70 T	06-02-2002
			EP	1151486 A1	07-11-2001
			EP	1149425 A1	31-10-2001
			WO	0036670 A1	22-06-2000
			WO	0036671 A1	22-06-2000
			US	2001053475 A1	20-12-2001
			US	2001000485 A1	26-04-2001
			US	6410182 B1	25-06-2002

Form PCT/ISA/210 (patent family annex) (July 1992)